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Marine Casualty Investigations

Enquêtes sur les accidents maritimes

Investigation Report to the Minister pursuant to sections 542 or 545 of the Canada Shipping Act

Rapport d'investigation au Ministre conformément aux articles 542 ou 545 de la Loi sur la marine marchande du Canada

Canada

Ce rapport est aussi disponible en français.

REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES SURROUNDING THE FIRE ON BOARD AND THE SUBSEQUENT SINKING OF THE CANADIAN FISHING VESSEL "JEAN N" WHILE ALONGSIDE AT KRAUT POINT, NOVA SCOTIA, FEBRUARY 1, 1987

REPORT No. 487

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REPORT OF INVESTIGATION INTO THE CIRCUMSTANCES SURROUNDING THE FIRE ON BOARD AND THE SUBSEQUENT SINKING OF THE CANADIAN FISHING VESSEL "JEAN N" WHILE ALONGSIDE AT KRAUT POINT, NOVA SCOTIA, FEBRUARY 1, 1987

Particulars of Vessel

Name	"JEAN N"
Official Number	318930
Port of Registry	Lunenburg
Call Sign	VC4656
Gross Tonnage	188.85
Net Tonnage	80.15
Length	27.4 m
Breadth	7.28 m
Depth	3.84 m
Draught (estimated at time of casualty)	F: 2.87 m A: 4.09 m
Type	Wood, scallop dragger
Built	1963, Mahone Bay, N.S.
Propulsion	Single screw, one 477 kW Fairbank-Morse diesel engine
Cargo	Nil
Crew	Nil
Owners	Fishery Products International Limited St. John's, Newfoundland

Description of Vessel

The "JEAN N" was a typical east coast scallop dragger of wood construction with machinery, deck-house and wheel-house located aft of the fish hold. The deck-house contained a galley and messroom area along with a two berth cabin, provisions store, washroom facilities and an oilskin locker.

A cabin was located directly aft of the engine-room,

separated by a watertight bulkhead fitted with a door. A second engine-room-access was located on the forward port side leading up to the main deck.

Interior access through the after accommodation was via open companionways.

NOTE: (1) All times in this report are expressed in Atlantic Standard Time (UTC minus 4 hours).

Background

During the early morning of February 1, 1987, the F.V. "JEAN N" was secured alongside the Government Wharf at Kraut (Krout) Point, Nova Scotia, when a fire occurred in the after end of the vessel.

In spite of the efforts by six volunteer fire departments and their equipment, the fire continued until the vessel sank alongside the wharf.

Later that same evening, the fire re-ignited, resulting in damage to the wharf structure and threatening other fishing vessels secured nearby.

The fire was again extinguished but not until the portion of the vessel's superstructure which had remained above the surface of the water sustained extensive damage.

There were no reported injuries or fatalities and damage was confined to the "JEAN N" and the wharf structure, the combined damage loss being in excess of ½ million dollars.

An undetermined amount of light oil pollution occurred; however, it appeared to be contained by the harbour ice.

Narrative

The F.V. "JEAN N" had been secured alongside the Kraut Point wharf, adjacent to the Fisheries Products International plant since November 8, 1986.

It was the owner's intention to carry out the vessel's annual refit during February, 1987, and prepare the "JEAN N" to resume fishing during March, 1987, weather conditions permitting.

While alongside, the "JEAN N" was connected to shore

supplied electricity, which ran a hot water heating boiler and circulating pump.

After normal working hours and during the weekend, a watchman is on duty, based in a gatehouse at the entrance to the owner's property. As part of his routine duties, the watchman makes fire rounds of all company vessels secured alongside Kraut Point and at another wharf in Riverport, approximately 2 km distance by road.

At 0000, February 1, 1987, the watchman made rounds of the company vessels, including the "JEAN N", and found all in order. By approximately 0300, the watchman had left the gatehouse, driven to Riverport and carried out his routine inspection of the vessels secured there.

After returning from Riverport at an estimated 0315, the watchman noticed the deck lights on the "JEAN N" were out and proceeded towards the vessel to investigate. As he approached the vessel, the watchman observed sparks emerging from the exhaust cowling area and moments later saw an intermittent flame. He immediately proceeded to the nearest telephone and alerted the Riverport Volunteer Fire Department.

The alarm was recorded at the Riverport Volunteer Fire Department as being received at 0348 and by 0414, the first unit had arrived on the wharf. Moments later, a fire-fighter equipped with a breathing apparatus was accompanied by the watchman and boarded the vessel. After being unlocked, the deck-house aft starboard door, which leads into the accommodation area and engine-room access, was opened slightly; however, it was immediately closed when dense smoke emanated from the opening.

By this time, other units had arrived from the local volunteer fire department and the watchman left the area to alert management personnel and private vessel owners.

Personnel from the Riverport Volunteer Fire Department immediately began their attempt to extinguish the blaze by using hoses and foam application equipment.

At approximately 0500, in response to a mutual aid alarm, fire-fighting units from the communities of Dayspring, Lunenburg, LaHave and Mahone Bay were at the scene. Foam concentrate was being supplied by the Hebbville Fire Department, with additional breathing apparatus being provided by the Bridgewater Fire Department.

By this time, it appeared the fire in the vessel's aft

interior was well established, making entry into the area hazardous. As a result, the fire-fighters attempted to apply foam through the wheel-house windows in hopes that it would gravitate to the seat of the fire.

At approximately 0600, concern was expressed for other vessels secured nearby. Three of the closest were moved, then stood by to be used as towing vessels if required.

During the morning it appeared that at several times the fire was under control, however, it would re-ignite shortly afterward. Portable pumps had also been placed on board and were drawing excess water from the vessel's fish hold in an effort to keep the "JEAN N" afloat.

By approximately 1030, some 42 containers of both high and low expansion foam concentrate had been pumped into the "JEAN N", extinguishing all visible flame.

At this time, it was decided to stop pumping water into the vessel's after accommodation, however, at 1100 the "JEAN N" appeared to be settling lower in the water aft. All on board rapidly removed their equipment and themselves to the wharf.

At this time a wire rope trawl warp was secured to the vessel's foremast in an effort to keep the "JEAN N" from capsizing.

By approximately 1130, the "JEAN N" had settled on the bottom with a port list, and boat deck awash.

Although a damage assessment could not be made at this time, it appeared that the vessel's after superstructure was intact; however, the area probably sustained considerable interior damage.

By 1230, all fire-fighting personnel had left the area, satisfied that the fire had been safely extinguished.

An undetermined amount of light oil had surfaced around the vessel and by this time Canadian Coast Guard personnel had arrived with equipment to contain any pollution. This equipment was not immediately deployed as any oil pollution was being contained by harbour ice.

At approximately 1800, the wheel-house of the "JEAN N" was ablaze and the alarm raised immediately. By 1815, fire-fighting units of the Riverport Volunteer Fire Department were arriving at the scene. At this time it was discovered that approximately 30 m of the wood wharf sheathing in the

vicinity of the burning vessel also had ignited.

The first unit to arrive on the wharf was able to extinguish the burning wheel-house; however, the fire-fighters experienced difficulty in effectively reaching the wharf sheathing. By this time fuel oil floating on the surface of the water had ignited under the wharf, spreading to the supporting wood structure.

After other fishing vessels secured to the wharf had been moved, portable pumps were placed on board smaller craft and used as fire boats. Sections of the wharf sheathing were cut away for access, as efforts continued to contain the fire.

By 2200, the fire appeared to be under control and, by 2215, was reported extinguished.

This second outburst of flame consumed much of the sunken vessel's after superstructure which remained above-water. Although the vessel's insured value was in the area of $300,000, the cost of a modern steel hull replacement is estimated at $3,000,000. The "JEAN N" was subsequently declared a constructive total loss by the insurance under-writers.

The Government Wharf sustained fire damage to areas of concrete, sheathing, cross bracing and support piles. Repairs to the wharf are estimated to cost $200,000.

The "JEAN N" was salvaged and refloated on March 26. After surveys of the vessel's damage were conducted by various interested agencies, the "JEAN N" was prepared for disposal. On April 3, 1987, the "JEAN N" was towed to an approved dumping site, latitude 43°43'30"N, longitude 63°51'50" W, and sunk in 285 m of water.

Analysis

1. Weather

When the fire was discovered, visibility was reduced in freezing rain and snow. The wind was NE at 35 to 40 knots with an estimated air temperature of 0°C. The harbour surface was calm with a light ice cover.

Later that same evening when the vessel re-ignited, the wind had backed to NW at 30 to 35 knots and precipitation was reduced to snow flurries.

Prior to the casualty the area had experienced a considerable snowfall and this, combined with subsequent freezing rain, made driving hazardous.

As a result of the weather conditions, many volunteer fire-fighters and some of the owner's personnel were unavoidably delayed in their initial response to this casualty.

2. Tidal conditions

When the fire was discovered, the tide was ebbing with predicted low water at 0415. During the first fire-fighting operation, the tide was flooding with high water at 1000.

When the fire re-ignited at approximately 1800, the tide was flooding, low water having been at 1645. During the second fire-fighting operation, while the vessel was resting on the bottom, the fire was reported extinguished at 2215, with high water at 2235.

Reported depths alongside the wharf at low water are between 4.6 to 6.7 m. High water is approximately 1.9 m above chart datum.

3. Initial response

When the first fire-fighting unit arrived on the scene, a volunteer fireman equipped with a breathing apparatus attempted to enter the vessel's after accommodation.

Due to the general poor visibility and dense smoke, the fire-fighter did not enter the accommodation after a brief investigation of the situation as he was the only person equipped with a breathing apparatus at that time.

By the time other fire department personnel had arrived and hoses were connected, the blaze was well established and prevented entry into the after accommodation.

4. Fire-fighting procedure

Upon arrival, personnel from the Riverport Volunteer Fire Department rigged two 38 mm (1½ in) fire-hoses and began to direct water towards the vessel. Shortly after a single 64 mm (2½ in) fire-hose with a 'Y' connection was run from a pump truck to supply an additional water source.

Various attempts were made to apply foam into the after

end of the vessel through the port side forward engine-room access, however, heat and smoke hampered these efforts.

A mutual aid request was sent to volunteer fire departments in the nearby communities of Lunenburg, Mahone Bay, Dayspring and LaHave at 0431. In addition, the fire departments from Hebbville and Bridgewater assisted by providing foam concentrate and recharging breathing apparatus cylinders.

At approximately 0600, it was suggested that the "JEAN N" be towed away from the wharf to remove possibilities of the fire spreading.

After consideration, this suggestion was rejected for the following reasons:

- effective methods of fire-fighting would stop once the vessel was moved away from the wharf,

- towing vessels could be involved in a dangerous situation,

- while attempting to move the vessel in the strong NE wind, the "JEAN N" could possibly lay against the inside berth where fueling lines were located, and

- the towing operation could possibly be hampered by the harbour ice, allowing the "JEAN N" to burn and sink, which could cause a more serious pollution problem, obstruct vessel traffic and create a difficult salvage situation.

Based on these considerations, efforts continued to extinguish the fire and keep the "JEAN N" afloat while the vessel remained alongside.

By approximately 0900, access had been cut through the boat deck in an attempt to supply foam directly to the seat of the fire. Foam was also being directed to the after accommodation, down through the wheel-house.

At approximately 1000, all visible flame appeared to be extinguished except for various smoldering areas. By this time a pump had been placed on board the vessel and attempts were being made to remove excess water from the fish hold. At 1030, the fire departments discontinued supplying water to the vessel. Two additional portable pumps were provided at this time to remove water from

the vessel.

Reportedly, approximately 975 L of combined low and high expansion foam, along with AFFF (aqueous film-forming foam) concentrate were used during the fire-fighting operations.

5. Sinking

Although the actual amount of water pumped into the "JEAN N" during the fire-fighting operation is not known, it is estimated that approximately 31,500 L would be used in the application of the foam concentrate.

When the fire department stopped applying water to the "JEAN N", the vessel's freeboard at the forward end of the deck-house was estimated to be 76 mm, with an approximate 1 m depth of water in the aft end of the fish hold, which probably leaked through the engine-room bulkhead.

By approximately 1100, two portable pumps were removing water from the vessel's fish hold with a third unit being prepared. Due to the heat and smoke it was not possible to pump out water from the engine-room through the port forward access.

It appears that as water was removed from the fish hold, the "JEAN N" trimmed further by the stern, immersing the after main deck.

At this time personnel on board the vessel were advised by observers on the wharf that the "JEAN N" appeared to be rapidly settling aft. After removing the portable pumping equipment, all on board moved to the adjacent wharf. The "JEAN N" continued to trim by the stern and by approximately 1130 was resting on the bottom with a port list and her boat deck awash.

6. Subsequent fire

When the fire-fighters left the Kraut Point wharf at approximately 1230, the fire had been extinguished except for some slight smouldering in the vessel's wheel-house, which remained above water at high tide. Instructions were issued to the watchmen to keep the vessel under observation and alert the fire department at the first indication or suspicion of re-ignition.

When the vessel was observed at 1300, a slight amount of white smoke was noticed from a wheel-house window;

however, given the conditions at that time, it was not considered to be a cause for concern.

During the afternoon both fire department and owner's personnel returned to the wharf to determine the vessel's condition at low water. Although there was still some slight smouldering in the wheel-house, it did not appear to be critical.

At approximately 1800, the watchman was returning from his rounds of the vessels berthed at Riverport and noticed smoke, then flame, around the "JEAN N". He immediately proceeded to call the fire department; but before he was able to do so, heard the alarm at the fire hall. The watchman then unlocked some of the owner's vessels in the event they would have to be moved. By this time the fire had spread under the wharf making access to the vessels difficult.

This second alarm was recorded as being received by the Riverport Volunteer Fire Department at 1815, with the first unit leaving the fire hall at 1818. At this time another mutual aid request was sent to volunteer fire departments located in nearby communities.

When the first unit arrived at the scene minutes later, fire-fighters were able to extinguish the burning wheel-house and exposed superstructure; however, ice and snow made access to the fire in the wharf structure difficult.

Vessels secured alongside the wharf were moved clear of the immediate area. Portable pumping units were put on board two smaller fishing vessels and used as platforms for fighting the fire. Another inshore fishing vessel equipped with a portable pump arrived and also assisted with the fire-fighting operation. By this time the south-east end of the wharf was engulfed in smoke and flame.

Sections of the wharf sheathing were cut away to provide access to the fire; however, due to the creosote covered wood wharf structure and burning diesel oil on the surface of the water, the flame was not totally extinguished until 2215.

A number of fire-fighters and their equipment remained at the scene until 0930, April 2. During the evening the fire occasionally re-ignited but was rapidly extinguished by the fire-fighters standing by.

While the wind was NE, the smouldering areas of the wheel-house were relatively sheltered by the wharf. During the evening these smouldering areas were more exposed to the wind when it backed to NW, re-igniting the wheel-house and diesel oil floating on the surface, then spreading to the wood structure of the wharf.

7. Damage

Although an accurate damage assessment could not be made with the "JEAN N" partially submerged after the initial fire, much of the aft superstructure and deck appeared to be intact. It was suspected at this time much of the vessel's aft interior had sustained extensive damage.

After the fire re-ignited, much of the vessel's aft superstructure remaining above the water was consumed.

When the "JEAN N" was raised, it was discovered that the cabin located aft of the engine-room was completely destroyed, along with the steering gear space and storage areas below the main deck.

The accommodation and galley areas located on the main deck were completely gutted by the fire. The main deck located within the accommodation was totally consumed by the fire and was extensively damaged aft.

Although initially suspected as the origin of the fire, the engine-room and its machinery was relatively undamaged except in way of the aft watertight bulkhead. The hot water heating boiler located in the engine-room sustained only minor damage and did not indicate being a source of ignition.

8. Cause of the fire

It would appear the fire originated in the cabin area, located directly aft of the engine-room.

Although initially suspected as a source of ignition, the hot water heating boiler was relatively undamaged and does not appear to be a contributing factor to the fire.

Shore supplied electrical power at 240 V AC, three phase, and fused 200 A at source, was connected to the vessel by a standard number 6, three conductor marine cable through a Crouse Hynes three pole plug and receptacle. Electrical power was then fed to a three pole, 30 A switchbox by number 6 armoured, three

conductor cable. From this connection power was supplied to the rectifier unit through a 30 A fused, two pole switchbox. A transformer in the rectifier unit reduced the 240 V AC to 120 V AC and was converted to 110 V DC through a circuit containing four, 100 A diodes mounted on heat sinks. The 110 V DC power was then fed through 60 A cartridge type fuses to the vessel's switchboard distribution circuits.

When the fire occurred, electrical power was being supplied to the hot water heating boiler, hot water heating circulator pump and various lighting circuits.

Reportedly, additional electrical load could not be used without the 30 A fuses in the switchbox failing.

The 240 V AC to 110 V DC voltage rectifier and switchbox were both mounted on the vessel's stern post in the cabin aft of the engine-room. From the extensive damage sustained in this area of the vessel, it is most likely the source of ignition was an electrical fault, probably in the rectifier or 110 V DC switchbox. This electrical fault could then generate sufficient overheating, arcing or flame to ignite any adjacent wood structure.

Although the suspect electrical equipment was sighted, these components were sufficiently damaged by heat and water to prevent an accurate condition assessment.

The rectifier unit manufacturer is not known, however, it was probably fabricated by the shipbuilder. It was suspected many of the original rectifier components would have been replaced considering the vessel's age.

Identifying markings on the switchboxes were destroyed by the fire, however, they would appear to be of Square D manufacture.

Another switchbox, also located in the cabin, connecting 240 V AC shore supply to an electrical water heater element (sidearm heater) was discovered to be in comparatively good condition, with the switch in the 'off' position.

9. Riverport volunteer fire department

The Riverport Volunteer Fire Department has among its members many former and active seafarers, including scallop fishermen and marine engineers. Many of the volunteer fire-fighters would have served in vessels similar to the "JEAN N", and be familiar with the

general arrangement on board a scallop dragger.

As part of a continuing training program, fire-fighters have on occasion practiced using breathing apparatus on board both ground fish and scallop draggers.

Although the Riverport Volunteer Fire Department was involved with a major fish plant fire during August 1981, shipboard fires are not a common occurrence in the community.

10. Vessel's certification

The vessel's inspection certificate, SIC 31, had expired December 29, 1986. It was the owner's intention to carry out the vessel's annual refit and regulatory inspections prior to resuming operation during March 1987.

A 'megger' test of the vessel's 110 V DC electrical system was conducted on January 8, 1985 as a requirement for annual inspection by the Canadian Coast Guard, Ship Safety Branch. At that time, all electrical circuits measured indicated an insulation resistance well within acceptable limits.

11. Oil pollution

When the fire occurred, an estimated 30,150 L diesel fuel oil remained on board the "JEAN N" and after sinking an undetermined amount of light oil escaped from the vessel. Containment equipment provided by the Canadian Coast Guard was not immediately deployed due to the harbour ice conditions, which appeared to be restricting the oil to the immediate area.

When the vessel's wheel-house subsequently re-ignited, an unknown amount of oil floating on the surface of the water would have been consumed by the fire.

During February 2, divers plugged all the vessel's fuel oil tank vents; however, some slight leakage continued, probably due to damaged piping or other fittings.

Prior to the vessel's disposal, all remaining oil was removed from the "JEAN N". Due to a measuring equipment failure, the exact amount recovered is not available; however, it is estimated at 6,750 L.

Although the amount of oil recovered would appear to be minimal, the casualty is not considered to have resulted

in any significant pollution.

Findings

Although the precise cause of the casualty can not be determined with certainty, it would appear that the fire on board the "JEAN N" resulting in the vessel's constructive total loss, was a result of the following:

- an electrical fault occurred within the shore power circuit, possibly in the 240 V AC rectifier unit aboard the vessel;

- this electrical fault created an ignition source by producing overheating, arcing or flame;

- the heat generated by the electrical fault caused the adjacent wood structure to ignite, and

- the vessel sank alongside the wharf while an attempt was being made to remove water which had accumulated during the fire-fighting operation.

It would further appear that:

- the freezing rain delayed the arrival of the fire-fighters and this freezing rain in conjunction with strong winds hampered the fire-fighting operations;

- the fire aboard the sunken vessel was not completely extinguished;

- a change in wind direction re-ignited smouldering areas in the wheel-house; and

- the subsequent fire ignited fuel oil on the surface of the water and spread to the adjacent wharf resulting in damage to the structure.

Other Findings

Prior to the casualty, routine fire rounds of the vessel were conducted.

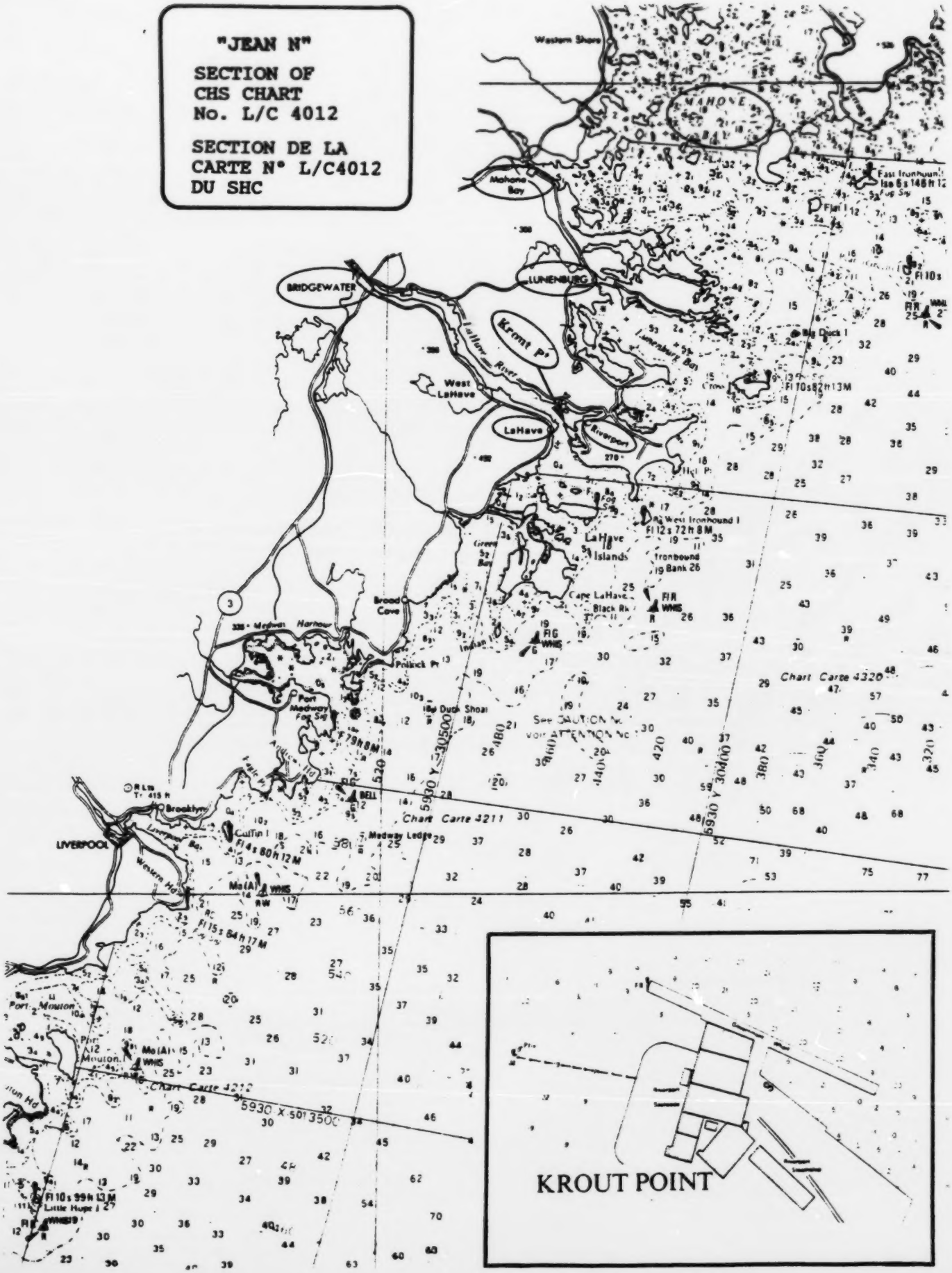
Due to the measures taken, the casualty did not result in any significant oil pollution.

OTTAWA, ONTARIO
OCTOBER 1987.

"JEAN N"

SECTION OF
CHS CHART
No. L/C 4012

SECTION DE LA
CARTE N° L/C4012
DU SHC

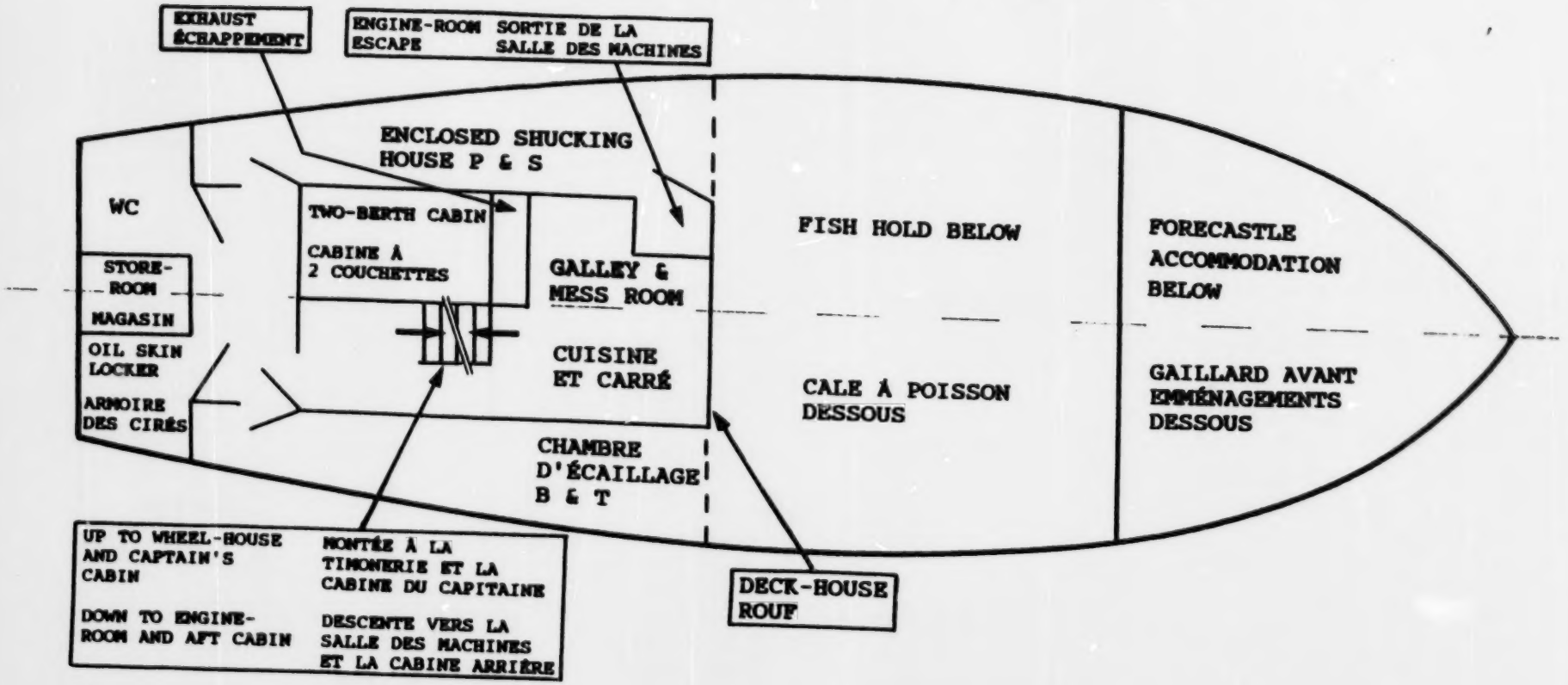


F.V. B.P.

"JEAN N"

GENERAL ARRANGEMENT AT MAIN DECK

DISPOSITION GÉNÉRALE DU PONT PRINCIPAL



NOT TO SCALE PAS DRESSÉ À L'ÉCHELLE

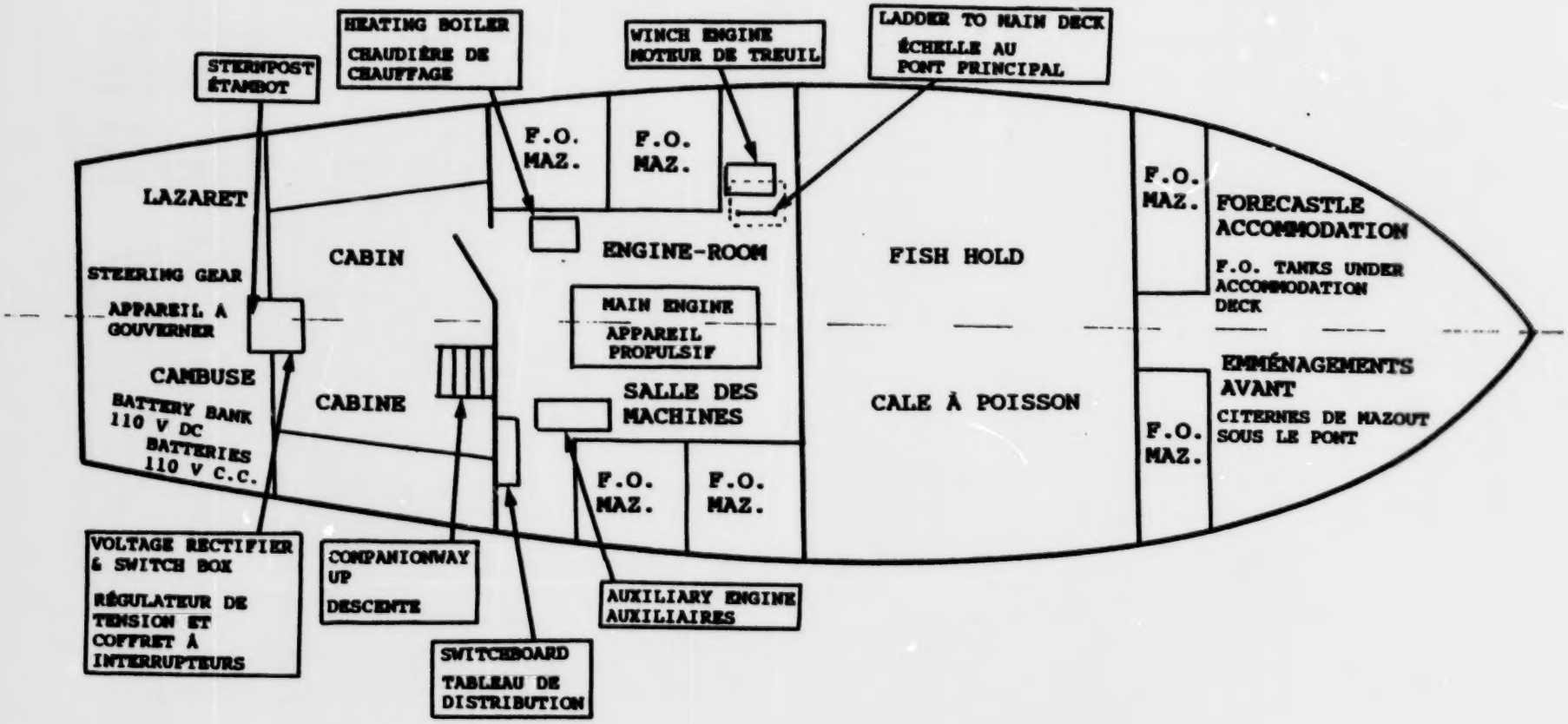
DETAILS APPROXIMATE DÉTAILLÉ APPROXIMATIVEMENT

F.V. B.P.

"JEAN N"

GENERAL ARRANGEMENT BELOW MAIN DECK

DISPOSITION GÉNÉRALE SOUS LE PONT PRINCIPAL

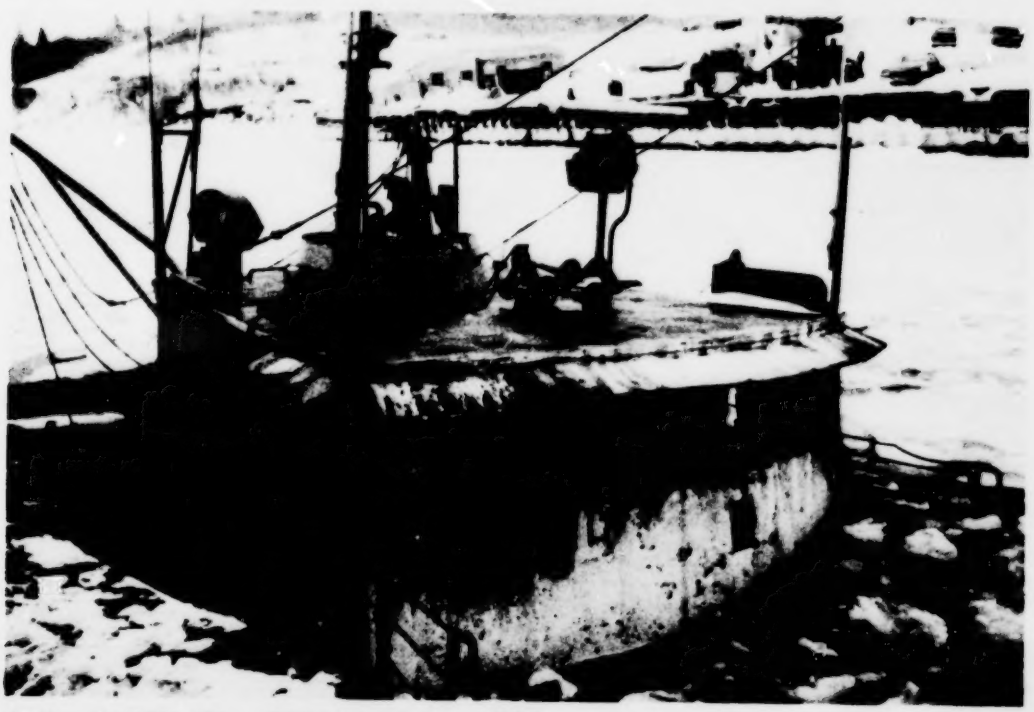


NOT TO SCALE PAS DRESSÉ À L'ÉCHELLE

DETAILS APPROXIMATE DÉTAILLÉ APPROXIMATIVEMENT

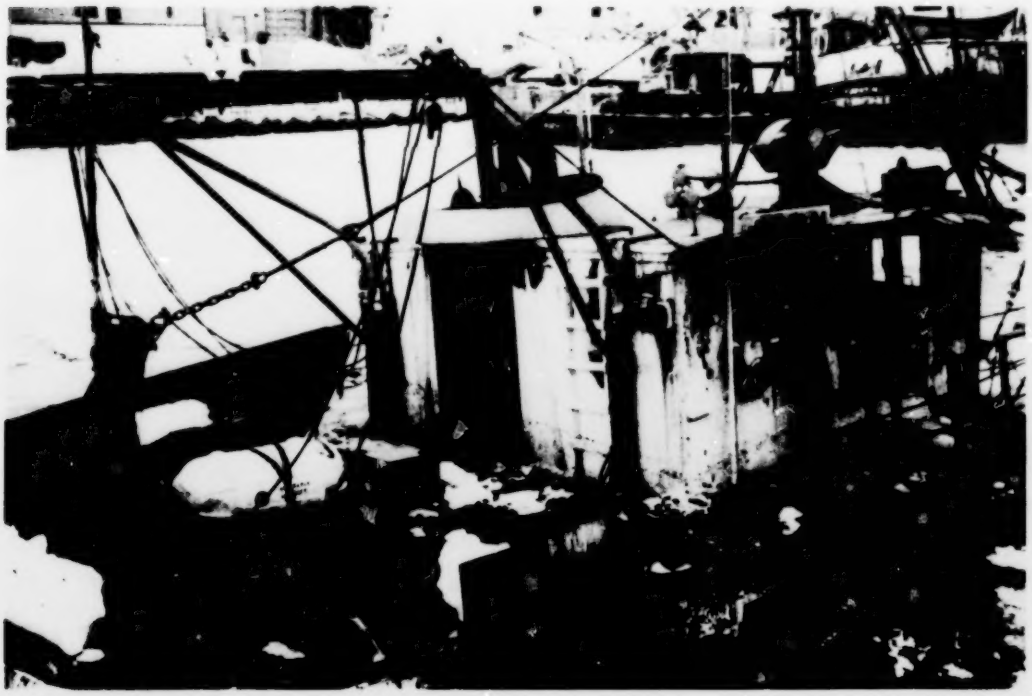
F.V. "JEAN N", February 1, 1987. (Prior to re-ignition)

B.P. "JEAN N" le 1er février 1987. (Avant la recrudescence)



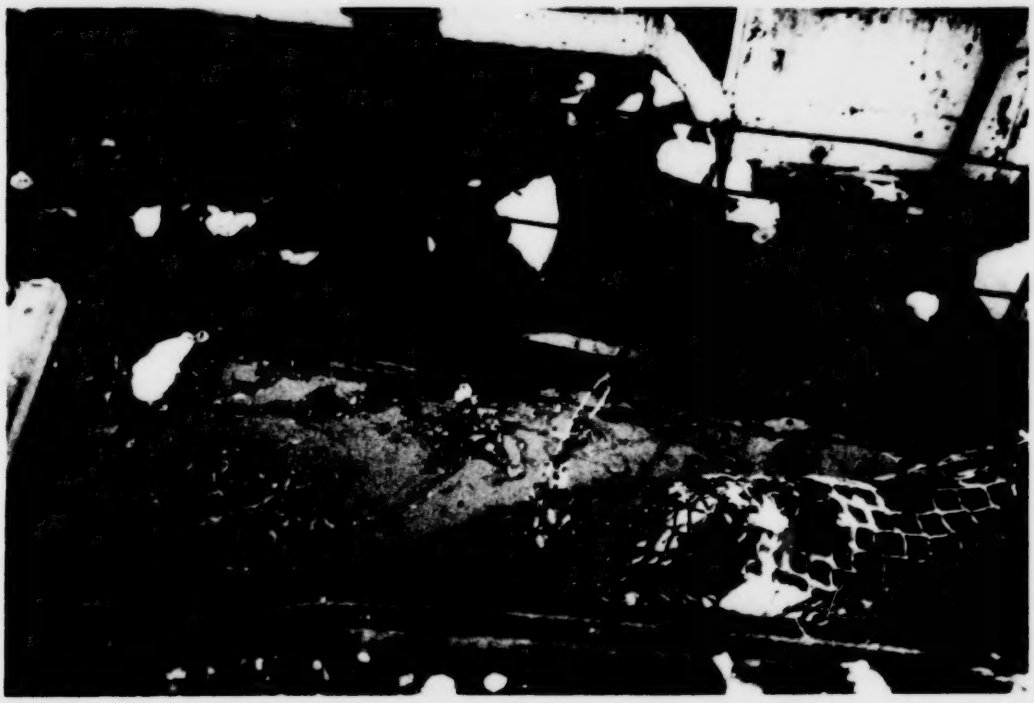
F.V. "JEAN N", February 1, 1987.
Wheel-house. (Prior to re-ignition)

B.P. "JEAN N" le 1er février 1987.
Timonerie. (Avant la recrudescence)



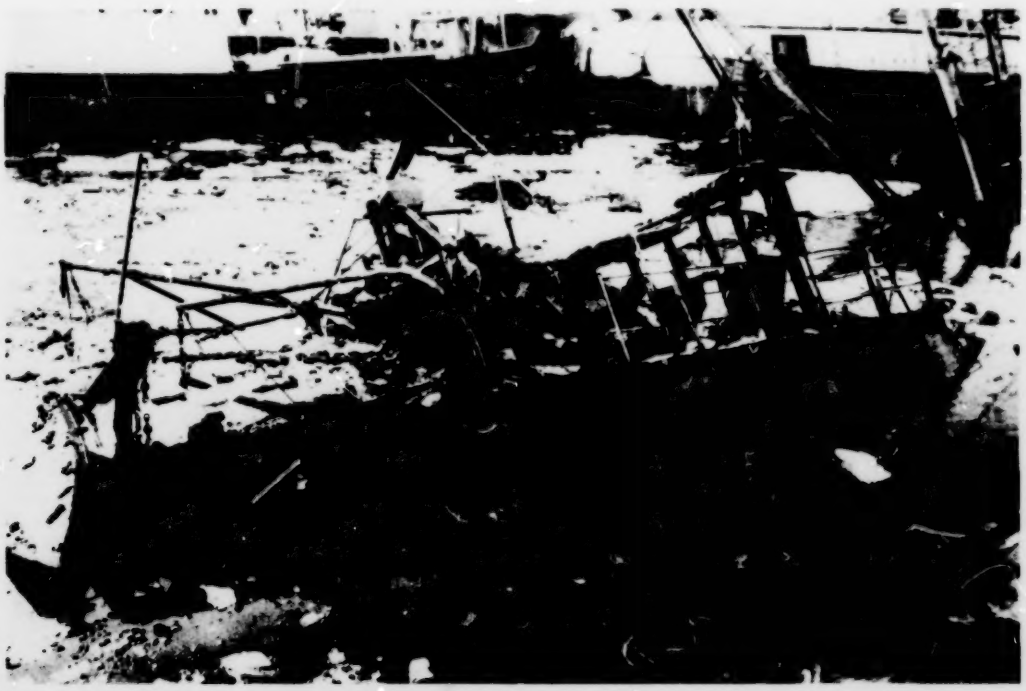
F.V. "JEAN N", February 1, 1987. Boat deck and wheel-house from aft. (Prior to re-ignition)

B.P. "JEAN N" le 1er février 1987. Vue du pont des embarcations et de la timonerie de l'arrière. (Avant la recrudescence)



Light oil between wharf and vessel. (Prior to re-ignition)

Huile légère entre le quai et le bateau.
(Avant la recrudescence)



F.V. "JEAN N", February 2, 1987.

B.P. "JEAN N" le 2 février 1987.

Damage to wharf wood structure.

Dommage à la structure de bois du quai.

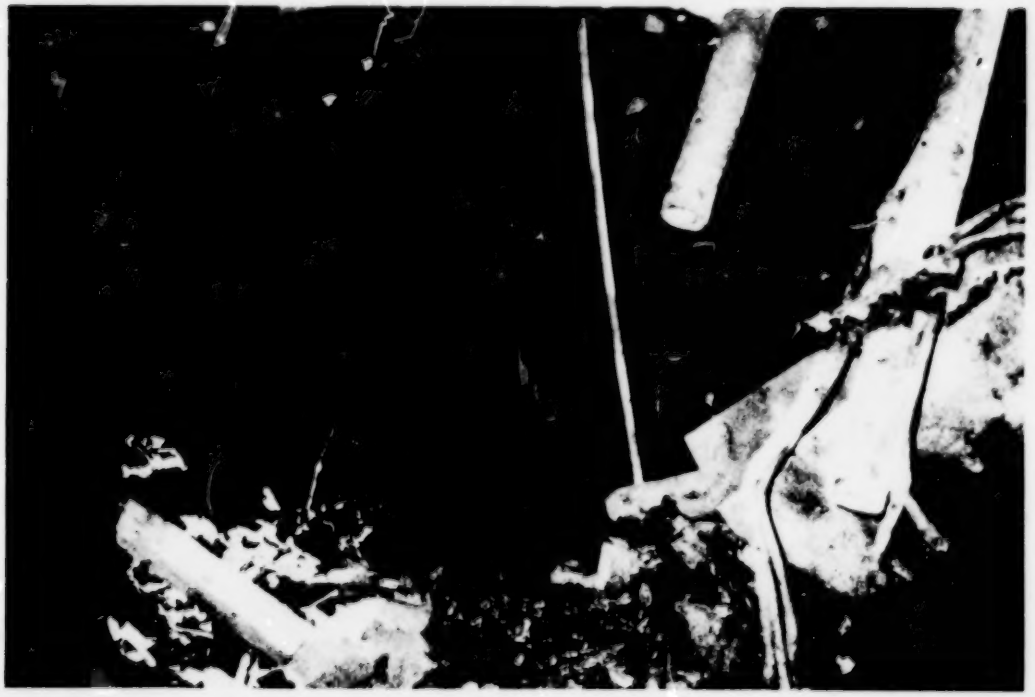
Rectifier unit.

Régulateur.

110V DC switch box, with two 30A fuses.
(Rectifier unit front cover beneath.)

Coffret à interrupteurs -110V C.C., avec deux fusibles 30A.
(Panneau avant du régulateur dessous.)

F.V. "JEAN N" prior to disposal.
B.P. "JEAN N" avant de s'en défaire.



Aft cabin area.
Emplacement de la cabine arrière.